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PROBLEMS.

44. Proposed by LEONARD E. DICKSON, M. A., Fellow in Mathematics, University of Chicago.

Find the general term in the series 1, 3, 10, 35, 126, 462, 1716, 6435, 24310, ...,which plays a remarkable part in some recent theorems in my theory of Regular Polygons.

45. Proposed by WILLIAM HOOVER, A. M., Ph. D., Ohio State University, Athens, Ohio.

Find x from $\cos^{-1}\dfrac{1-x^2}{1+x^2}+\tan^{-1}\dfrac{2x}{1-x^2}=\dfrac{4\pi}{3}$.

◆

GEOMETRY.

Conducted by B. F. FINKEL, Kidder, Mo. All contributions to this department should be sent to him.

SOLUTIONS OF PROBLEMS.

32. Proposed by WILLIAM HOOVER, A. M., Ph. D., Professor of Mathematics in the Ohio State University, Athens, Ohio.

If a conic be incribed in a triangle and its focus move along a given straight line, the locus of the other focus is a conic circumscribing the triangle.

I. Solution by Professor G. B. M. ZERR, A. M., Principal of High School, Staunton, Virginia.

Using trilinear co-ordinates the equation to the inscribed ellipse is of the form $\surd(l\alpha)+\surd(m\beta)+\surd(n\gamma)=0$.

Let $\alpha'\ \beta'\ \gamma'$, be the co-ordinates of the one focus, then

$\dfrac{\alpha}{\alpha'}=\dfrac{\beta}{\beta'}$, $\dfrac{\beta}{\beta'}=\dfrac{\gamma}{\gamma'}=\dfrac{\alpha}{\alpha'}$ are the equations to the lines joining it to the vertices of the triangle. The lines to the other focus make equal angles with the sides of the triangles, hence, their equations are $\alpha'\alpha=\beta'\beta$, $\beta'\beta=\gamma'\gamma$, $\gamma'\gamma=\alpha'\alpha$. $\therefore$ the co-ordinates of the other focus may be taken

$\dfrac{1}{\alpha'}$, $\dfrac{1}{\beta'}$, $\dfrac{1}{\gamma}$; from this relation, if we are given the equation of any locus described by one focus, we can at once write down the equation of the locus described by the other focus.